

Claims

We claim:

- 5 1. In a system having a plurality of devices, wherein a plurality of configuration elements are associated with the plurality of devices, a method for automated generation of executable modules associated with the devices, the method comprising the steps of:
 - accessing information about one or more input configuration elements of the plurality of configuration elements, wherein the one or more input configuration elements are associated with one or more input rules;
 - determining which of the plurality of configuration elements could be accessed by the one or more input rules;
 - generating one or more output rules using at least the accessed information, the accessed configuration elements, and the input rules, wherein an output rule corresponds to one or more input configuration elements; and
 - generating at least one executable module adapted to access at least a given one of the input configuration elements and to trigger one or more of the output rules corresponding to the given input configuration element.
- 10 2. The method of claim 1, wherein the one or more input configuration elements are described by one or more configuration classes and wherein the one or more input rules are described by one or more rule files.
- 15 3. The method of claim 1, wherein the step of determining which of the plurality of configuration elements could be accessed further comprises the step of determining read and write sets of configuration elements for a given one of the one or more rules.
- 20 4. The method of claim 3, wherein the step of determining read and write sets of configuration elements further comprises the step of determining for the given rule a call chain emanating from the given rule.

5. The method of claim 4, wherein the step of determining for a given rule a call chain emanating from the rule further comprises the steps of determining whether the given rule accesses one or more items and determining whether one or
5 more other configuration elements are accessed by the one or more items.
6. The method of claim 5, wherein the one or more items comprise one or more rules or one or more utility methods.
- 10 7. The method of claim 5, wherein the step of determining read and write sets of configuration elements further comprises the steps of determining whether the one or more items accesses one or more additional items and determining whether one or more additional configuration elements are accessed by the one or more additional items.
- 15 8. The method of claim 1, wherein the step of determining which of the plurality of configuration elements could be accessed further comprise the step of determining, for a given one of one or more configuration elements able to be accessed by an input rule, a set of instance chain accesses for the given configuration
20 element.
9. The method of claim 8, wherein the given configuration element comprises a configuration element of a configuration class, wherein the given configuration element is another configuration class, and wherein the step of
25 determining, for a given one of one or more configuration elements able to be accessed by an input rule, a set of instance chain accesses for the given configuration element further comprises the step of determining every access for the other configuration class to other configuration elements.
- 30 10. The method of claim 1, wherein the step of generating at least one executable module further comprises the step of generating at least one class for a

given one of the one or more output rules, the at least one class defining the at least one executable module.

11. The method of claim 10, wherein the at least one class comprises one
5 or more statements adapted to access at least one given configuration element that corresponds to the one or more output rules.

12. The method of claim 10, wherein each of the at least one classes comprises one or more methods adapted to access the at least one given configuration
10 element.

13. The method of claim 12, wherein the access comprises reading,
writing, or modifying the at least one given configuration element.

15 14. The method of claim 1, wherein the at least one executable module is adapted to trigger the one or more output rules corresponding to the given input configuration element through deferred triggering of the one or more output rules.

15. The method of claim 1, wherein the at least one executable module is
20 adapted to trigger the one or more output rules corresponding to the given input configuration element through direct triggering of the one or more output rules.

16. The method of claim 1, wherein the at least one executable module is
adapted to trigger the one or more output rules corresponding to the given input
25 configuration element through batch triggering of the one or more output rules.

17. The method of claim 3, wherein the one or more output rules comprise two or more output rules, and wherein the method further comprises the step of performing a circularity check by determining dependency relationships between the
30 two or more output rules and by determining whether a given one of the two or more output rules depends upon itself.

18. The method of claim 1, wherein the information further comprises at least one range restriction corresponding to the given input configuration element and wherein the at least one executable module is adapted to ensure that the at least one range restriction is met when the given configuration element accessed by the one or
5 more triggered output rules is assigned a value.
19. The method of claim 1, wherein the information further comprises at least one referential integrity restriction corresponding to the given input configuration element and wherein the at least one executable module is further adapted to ensure that the at least one referential integrity restriction is met when the given configuration element is accessed by the one or more triggered output rules.
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20. In a system having a plurality of devices, wherein a plurality of configuration elements are associated with the plurality of devices, an apparatus for
15 automated generation of executable modules associated with the devices, the apparatus comprising:

a memory; and

at least one processor, coupled to the memory;

the apparatus being operative:

20 to access information about one or more input configuration elements of the plurality of configuration elements, wherein the one or more input configuration elements are associated with one or more input rules;

to determine which of the plurality of configuration elements could be accessed by the one or more input rules;

25 to generate one or more output rules using at least the accessed information, the accessed configuration elements, and the input rules, wherein an output rule corresponds to one or more input configuration elements; and

to generate at least one executable module adapted to access at least a given one of the input configuration elements and to trigger one or more of the output
30 rules corresponding to the given input configuration element.

21. An article of manufacture for use in a system having a plurality of devices, wherein a plurality of configuration elements are associated with the plurality of devices, and for automated generation of executable modules associated with the device, the article of manufacture comprising:

5 a machine readable medium containing one or more programs which when executed implement the steps of:

 accessing information about one or more input configuration elements of the plurality of configuration elements, wherein the one or more input configuration elements are associated with one or more input rules;

10 determining which of the plurality of configuration elements could be accessed by the one or more input rules;

 generating one or more output rules using at least the accessed information, the accessed configuration elements, and the input rules, wherein an output rule corresponds to one or more input configuration elements; and

15 generating at least one executable module adapted to access at least a given one of the input configuration elements and to trigger one or more of the output rules corresponding to the given input configuration element.